

REMARKS

The Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

No claims are amended, canceled, or added. Claims 1, 2, 4-17, and 19-21 remain pending in this application.

The sole remaining rejection in the application is the rejection of claims 1, 2, 4-17, and 19-21 as being unpatentable under 35 U.S.C. § 103(a). The cited references are US 6,083,425, issued to Clawson *et al.*, in view of US 6,436,363, issued to Hwang *et al.*

Applicants submit that neither Clawson, Hwang, or the combination thereof teaches or suggests each and every element of the claims as pending. Further, neither of the references provide reason to the person of ordinary skill in the art to provide for each and every element of the claims. Claim 1 as pending currently recites, with emphasis added:

A fuel processor for generating a H₂ rich gas from a fuel, comprising:

- (a) an inlet projecting through an exterior housing of the fuel processor attached to a steam line, an O₂ rich gas line, and a fuel line;
- (b) an inner reforming zone comprising a sidewall, a first end connected to the inlet, a partial oxidation catalyst and a steam reforming catalyst or a combined partial oxidation and steam reforming catalyst, and a second end;
- (c) an outer reforming zone comprising the sidewall of the inner reforming zone, an outer sidewall, a first end connected to the second end of the inner reforming zone, and a second end;
- (d) a cooling zone comprising a first end connected to the second end of the outer reforming zone and a second end;
- (e) a sulfur removal zone comprising a sulfur removal agent, a first end connected to the second end of the cooling zone, and a second end; and

(f) a water-gas-shift zone comprising a catalyst that catalyzes the conversion of carbon monoxide and water to carbon dioxide and H_2 , a first end connected to the second end of the sulfur removal zone, and a second end connected to an outlet of the fuel processor;

wherein the outer reforming zone further comprises a partial oxidation catalyst and a steam reforming catalyst or a combined partial oxidation and steam reforming catalyst; and wherein the fuel processor is configured to conduct simultaneously a partial oxidation reaction and a steam reforming reaction in the outer reforming zone.

Applicants point out a number of the features and required order of the features in the apparatus. First, the outer reforming zone requires the presence of a catalyst. Second, the sulfur removal zone is immediately after the cooling zone, and is required to be so by the connections that are described. With respect to independent claim 11, the sulfur removal zone is also immediately after the cooling zone. Neither Clawson nor Hwang teach or suggest at least these elements.

In the instant Office Action, by way of reference to the previous Office Actions, the Examiner has cited Clawson as being indistinguishable from the presently claimed apparatus. See Instant Office Action page 2 and Office Action mailed April 9, 2008, page 2. In the citations to Clawson provided in the Office Action of April 9, the Examiner's assertion is with respect to Figure 1 of Clawson. As described by Clawson's Figure 1, there is an inner reforming zone 26 and a partial oxidation zone 24. A second vessel 58 surrounds the first vessel 18 to make a passage region for the gases, *i.e.* a flow distribution region 63. Clawson notes that inside the second vessel 58 further reformation of the fuels can take place along with cooling. Col. 4, lines 41-42. The remaining zones of Clawson are then the high temperature shift zone 66, the sulfur removal zone 71, then the cooling zone 72, and the low temperature shift zone 76.

Applicants point out that the only feature of Clawson that may be an "outer" reforming zone is the flow distribution region 63 that is formed by second vessel 58 in and around the coils 32 surrounding the inner reforming zone 26 and separate partial oxidation zone 24. In fact, the

gas exiting this area is referred to as the heated reformat stream. Col. 6, line 31. However, the flow distribution region is devoid of any catalyst.

Claim 1 requires that the outer reforming zone have a catalyst. As shown by Clawson, any reforming that would occur in the flow distribution region is *uncatalyzed*. Furthermore, the fact that Clawson requires that this region provide cooling as well as further reforming would require that the region be devoid of catalyst. This is due to the fact that the reactions are highly exothermic and any catalyst contained therein would only act to drive the temperature higher, not cool the reaction. Based upon this difference, Clawson and claim 1 of the instantly claimed invention (as well as those that depend therefrom), are readily distinguishable.

Applicants also note that if the flow distribution region is not an “outer” reforming zone, then no other region of Clawson is an “outer” reforming zone and Clawson would fail to teach or suggest each and every element of the claimed invention.

Also, as pointed out above, claim 1 requires that the sulfur removal zone be after the cooling zone. In Clawson, the sulfur removal zone 71 is clearly placed before the cooling zone 72 in the gas stream. *See* Figure 1. Based upon this difference, Clawson and the claims of the instant invention are readily distinguishable, and Hwang fails to fill these deficiencies.

Hwang is directed to a monolithic substrate with a channel that allows for a hydrocarbon, water, air mixture stream to flow. *See* U.S. 6,436,363 at col. 7, lines 5-19. Hwang discloses layered partial oxidation and steam reforming catalysts on the substrate, where one layer is on top of another layer, or they may be zoned. *See Id.* at col. 3, lines 48-60. However, there is no suggestion of the structure of the claimed fuel processor (much less an outer reforming zone having catalyst) and that the sulfur removal zone is immediately after the cooling zone. Thus, Hwang fails to fill the voids of Clawson, with respect to at least these claim elements.

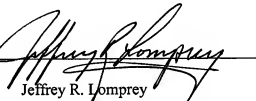
Applicants assert that Clawson and Hwang are readily distinguishable from the presently claimed invention. As such, Applicants respectfully request withdrawal of the remaining rejections and request that the application be allowed to proceed to issuance.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

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By


Jeffrey R. Lomprey
Attorney for Applicants
Registration No. 55,401

FOLEY & LARDNER LLP
Customer Number: 23524
Telephone: (608) 258-4288
Facsimile: (608) 258-4258

The Commissioner is hereby authorized to charge any fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.